

Chapter 16 WS

ΔH_{Phases} , ΔH_{Rxn} , & Hess's Law

Name: _____

Period: _____ Date: _____

Compound	ΔH_f (kJ/mol)	Compound	ΔH_f (kJ/mol)	Compound	ΔH_f (kJ/mol)	Phase Change (H ₂ O)	Energy (kJ/mol)
CH ₄ (g)	-74.8	NaF(s)	-569.0	NO(g)	+90.4	Vaporization	40.7
CO ₂ (g)	-393.5	NaOH(s)	-426.7	NO ₂ (g)	+33.9	Condensation	-40.7
NaCl(s)	-411.0	HCl(g)	-92.3	SnCl ₄ (l)	-545.2	Fusion	6.01
H ₂ O(l)	-285.8	H ₂ O(g)	-241.8	SnO(s)	-286.2	Solidification	-6.01
H ₂ S(g)	-20.1	SO ₂ (g)	-296.1	SnO ₂ (s)	-580.7	Sublimation	46.71
H ₂ SO ₄ (l)	-811.3	NH ₄ Cl(s)	-315.4	SO ₂ (g)	-296.1	Deposition	-46.71
MgSO ₄ (s)	-1278.2	NO(g)	+90.4	SO ₃ (g)	-395.2		
MnO(s)	-384.9	NO ₂ (g)	+33.9	ZnO(s)	-348.0		
MnO ₂ (s)	-519.7	SnCl ₄ (l)	-545.2	ZnS(s)	-202.9		
NaCl(s)	-411.0	CO(g)	-110.5				

Calculate the ΔH for each of the following phase changes for water using the table above.

- How much energy must be transferred to melt 75.0 g of ice?
- How much energy must be transferred to boil 25.7 g of water?
- How much energy must be transferred to sublimate 1.00 kg of water?
- How much energy must be transferred to deposit 55.1 g of steam?
- How much energy must be transferred to freeze 104 g of water?
- How much energy must be transferred to condense 2.75 kg of steam?

Calculate the ΔH^0 for each of the following reactions using the data table above.

- $\text{NaOH}_{(s)} + \text{HCl}_{(g)} \rightarrow \text{NaCl}_{(s)} + \text{H}_2\text{O}_{(g)}$
- $2\text{CO}_{(g)} + \text{O}_2_{(g)} \rightarrow \text{CO}_2_{(g)} + 2\text{H}_2\text{O}_{(l)}$
- $2\text{NO}_{(g)} + \text{O}_2_{(g)} \rightarrow 2\text{NO}_2_{(g)}$
- $\text{CH}_4_{(g)} + 2\text{O}_2_{(g)} \rightarrow \text{CO}_2_{(g)} + 2\text{H}_2\text{O}_{(l)}$
- $\text{H}_2\text{S}_{(g)} + 3\text{O}_2_{(g)} \rightarrow 2\text{H}_2\text{O}_{(l)} + 2\text{SO}_2_{(g)}$
- $\text{ZnS}_{(s)} + \text{H}_2_{(g)} \rightarrow \text{H}_2\text{S}_{(g)} + \text{Zn}_{(s)}$

Calculate the ΔH for each of the following reactions using Hess's Law

